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(19)

(54) FLEXIBLE BAG

(71) We, UCB, of 4, Chaussée de Charleroi, Saint-Gilles-lez-Bruxelles, Belgium, a Body Corporate organised under the laws of Belgium, do hereby declare the invention for which we pray that a patent may be granted to us, and the method by which it is to be performed, to be particularly described in and by the following statement:-

The present invention is concerned with a flexible bag, provided with a handle, for packing liquids, which liquids may be intended for drinking, for example mineral waters, beverages based on fruit juices, comestible oils, milk, vinegar or the like, or not intended for human consumption, for example mineral oils for engines or liquid detergents. The flexible bag of the present invention may also be used for packing flowable solids, such as granulated sugar, rice, detergent powders, granulated fertilisers and the like.

More particularly, the bag according to the present invention is a flexible bag having a handle and so constructed that it will stand upright on its base when partly or completely filled with a liquid or a flowable solid and which can be easily handled by means of the incorporated handle, unlike more simple packings, such as sachets or similar packings which do not have a support base, and which, consequently, are liable to spill their contents because of their instability once these packings have been opened and partly emptied.

French Patent Specification No. 2,171,001 discloses a flexible packing having a handle, which is composed of two walls of flexible plastics material having a substantially rectangular contour and connected together on three of their sides, while on the fourth side a deformable bellows is contained between the two walls, a handle being formed near one of the two corners of the rectangle opposite to the bellows, this handle comprising, on the one hand, an obliquely directed line of seal which joins together the two walls of the bag and, on the other hand, an elongated opening cut out obliquely between the said line of seal and the corresponding apex of the rectangle. Figures 12 and 13 of the accompanying drawings show a bag of this kind in a front view in Figure 12 and, in Figure 13, in section on the line XIII-XIII of Figure 12. In these Figures, 20 represents a single sheet of plastics material folded along a substantially W-shaped profile (Figure 13) to form a bellows 21, this sheet then being sealed along the three sides 22, 23 and 24 opposite to the bellows 21. An obliquely directed line of weld 25 joins together the two side walls of the bag from the top side to the vertical side 23 of the bag, while an elongated opening 26, cut out obliquely between the line of weld 25 and the corresponding apex of the rectangle, forms a handle. Under the weight of the liquid contained in this packing, the bellows 21 flattens and becomes practically planar, thus constituting a stable base for the bag, which can thus stand up. In order to empty the contents of the bag, the user cuts off the top corner of the bag opposite the handle, along the dotted line 27, holds the hand, lifts up the bag and pours its contents through the aperture thus formed, inclining the bag in the manner of a pot. The advantages quoted in this French Patent Specification for the bag provided with a handle are as follows:

it is capable of standing upright when full and also even if it contains only a small amount of liquid, the weight of this liquid being sufficient to keep the bellows flat;

its appearance is greatly improved in comparison with known sachets;

its handle enables it to be held like an ordinary pot for the purpose of emptying it, while, if it is not completely emptied immediately, its flat bottom enables it to be stored upright, for example in refrigerator

or a cupboard;

it is very easy to store flat when empty, before being filled;

it is particularly suitable for storing milk.

Nevertheless, in the course of use, it has been found that a bag of this kind also has various disadvantages, including the following:

(1) the handle lacks rigidity, its thickness being simply double the thickness of the sheet of plastics material used for making the bag;

(2) because of this lack of rigidity, the handle cannot contribute towards the stability of the bag when the latter is more or less empty;

(3) in addition, again due to lack of rigidity, when the liquid is being poured, the bag tends to oscillate on the line of seal 25, which behaves like a hinge, thus resulting in a lack of precision in the pouring of the liquid, and this can only be reduced or eliminated by using the other hand to support the bag;

(4) in addition, the position of the opening 26, into which the fingers are inserted in order to grip the handle, is fixed and situated far from the centre of gravity of the bag containing the liquid so that the effort needed to incline the bag during the pouring of the liquid is too great; furthermore, in proportion, as the level of liquid falls inside the bag, the centre of gravity becomes increasingly distant from the opening 26 of the handle, thus increasing the effort in proportion. When the content of the bag has been almost completely poured out, in order to discharge the remainder of the liquid, the user's wrist must, at that moment, be bent to such an extent that he has to make use of his other hand to support the bag and thus reduce the effort required of the wrist.

For these reasons, the present invention is concerned with a new, flexible bag, provided with a handle, for packing liquids and flowable solids, which is improved in that it does not have the various disadvantages mentioned above.

Thus, according to the present invention, there is provided a flexible bag, provided with a handle, which comprises two superimposed square- or rectangular-shaped walls of heat-sealable, flexible sheet material having the two vertical edges sealed together to form the two vertical edges of the bag and having the horizontal bottom edges connected together by a base bellows, which enables the bag to stand upright when partly or completely filled with a liquid or a flowable solid, and wherein the said two walls are further sealed together along an obliquely directed line of seal which starts from the horizontal top edges of these walls at a point situated in the portion lying between the first quarter and the fourth quarter of the length of the said top edges and joins one of the said two vertical edges of the bag at the point at which this vertical edge meets the apex of the base bellows or at a point on this verticle edge immediately adjacent thereto, thus defining in the bag two spaces, the first of which, which is intended to enclose the contents to be packed, is sealed by sealing together the horizontal top edges of the two walls thereof, when it has been filled with the said contents, and the second of which, which is intended to serve as a handle, is inflated with a gas under pressure and sealed by sealing together the horizontal top edges of the two walls thereof, said second space being sealed before, during or after sealing of said first space.

Because of the gas under pressure, which is preferably compressed air, the inflated handle has very great rigidity and its thickness can be several tens of times as great as the thickness of the sheet material used for making the bag. The disadvantage mentioned above in point (1) is thus overcome.

Because of this great rigidity of the handle, the latter makes a considerable contribution towards the stability of the bag when a greater or lesser proportion of the liquid contained in it has already been poured out, thus overcoming the disadvantage mentioned above in point (2).

With the bag according to the present invention, oscillation of the bag while the contents are being poured out cannot occur because, on the one hand, as stated above, the assembly comprising the bag and the handle and is very rigid and, on the other hand, the point where the bag is held by the fingers is situated at the actual position of the line of seal, which makes it impossible for the bag to oscillate about that line, while the inflated portion of the handle is situated in the hollow of the user's hand, thus providing a good grip. Consequently, the liquid contained in the bag is poured out with very great precision, without the user's other hand having to support the bag in the course of this operation. The disadvantage mentioned above in point (3) is thus eliminated.

When the bag according to the present invention is being used, the position of the fingers of the hand for the purpose of pouring out the liquid may vary and may be at any point along the line of seal. The further this position of the fingers is distant from the top edge of the bag, the more the inclination of the bag will increase. Consequently, whatever the degree to which the bag is filled and, consequently, whatever the situation of the centre of gravity of the bag, there exists for the fingers a position along the line of seal in which the bag can be

inclined without excessive, inconvenient bending of the wrist. The pouring can, therefore, be effected without the intervention of the user's other hand for supporting the bag, thus facilitating the pouring out of the liquid. The disadvantage mentioned above in point (4) is thus eliminated.

The nature, the thickness and the dimensions of the sheet material used for producing the bag are not specially critical. The heat-sealable, flexible sheet material may be more of a single heat-sealable plastics material (such as polyethylene or polypropylene) or a laminate formed by the lamination of a plurality of sheets of any plastics material (such as polyethylene, polypropylene, poly-(methyl terephthalate), a polyamide, polyvinyl chloride, an acrylonitrile copolymer or polyvinyl alcohol). Nevertheless, at least one of these sheets is of a heat-sealable thermoplastics material in order to enable the bag to be produced by sealing. In the case of a laminate, the latter may also comprise a sheet of a material other than plastics material, for example a sheet of paper or an aluminium or tin foil, as is current practice in the field of packing. The material for the production of the bag according to the present invention will obviously be selected in accordance with the liquid or flowable solid which is to be packed.

Similarly, the base bellows, which enable the bag of the present invention to stand up, is formed by methods known in the art. This bellows may, in particular, be produced by folding in W-shape (as in the case of a single sheet of packing material or laminate for the production of the bag) or by sealing an attached bellows of heat-sealable, flexible sheet material (as in the case of two sheets of packing material or laminates sealed to the bellows in order to form the bag in question).

Finally, the formation of a line of seal defining two spaces in the bag of the present invention is likewise not an innovation and constitutes an operation which is well known in the packing industry (see, in particular, French Patent Specification No. 2,171,001 already referred to).

The new characteristics of the bag of the present invention consist, on the one hand, of the position of the line of seal in the bag and, on the other hand, of the inflation with a compressed gas of the portion of the bag which is used as a handle.

With regard to the line of seal, as indicated above it starts from the horizontal top edges of the walls of the bag at a point situated in the portion lying between the first quarter and the fourth quarter of the length of the said top edges and joins one of the vertical edges of the bag at the point at which this vertical edge meets the apex of the base bellows or at a point on this vertical edge immediately adjacent thereto. It is particularly advantageous for the line of seal to end at the actual point of encounter with the apex of the base bellows; as previously explained, the nearer is the point where the bag is held to the centre of gravity of the bag, the easier it will be to empty the liquid from the bag when the latter is almost empty, thus reducing to a minimum the angle at which the arm and wrist of the user must be bent. The line of seal may be straight or curved. In the case of a curved line, it is advantageous for the undulations of the line of seal to have substantially the approximate width of the finger tips for the purpose of still further improving the gripping of the handle of the bag along this line of seal.

With regard to the space which is intended to serve as a handle for the bag according to the present invention, which is inflated with a gas under pressure, preferably with compressed air, the degree to which this space is inflated is preferably such that the thickness of the handle at the point of its maximum thickness, amounts to several tens of times the thickness of the walls of the bag. The upper limit of the degree of inflation depends upon the mechanical properties of the sheet material or materials used and upon the strength of the seal joints made for the production of the bag; the highest possible degree of inflation compatible with the mechanical strength of the bag made will obviously be selected.

For a better understanding of the present invention, several embodiments thereof will now be described in more detail, with reference to Figures 1 to 11 of the accompanying drawings, in which:

Figure 1 is a view in perspective of a sheet of material with a W-fold, which is used for making the bag according to the present invention;

Figure 2 is a front view of the sheet shown in Figure 1 in which, by heat-sealing, a series of transverse seals has been made in order to form the vertical edges of the bags;

Figure 3 is a detailed view of transverse seals of the kind shown in Figure 2, cut along their axes to form a series of individual bags;

Figure 4 shows a bag in which an oblique rectilinear seal has been made by heat-sealing in order to form two separate spaces in the bag;

Figure 5 shows a completed bag in which the top edge has been closed by heat sealing, one of the said spaces containing liquid and the other compressed air;

Figure 6 is a view in section along the line VI-VI of the bag shown in Figure 5;

Figures 7 to *9* show three stages of manufacture of the inflated handle of the

bag according to the present invention;

Figure 10 shows a bag according to the present invention which has an oblique curved line of seal and;

Figure 11 shows a bag according to the present invention which has an oblique sinusoidal line of seal in which each undulation has approximately the width of a finger.

In Figure 1, a sheet of material 1 has been provided with a W-shaped fold or bellows 2. This sheet (Figure 2) passes into a machine (not shown) which makes transverse seals 3 which will constitute the vertical edges 3 of the bag. In Figure 3, it is shown that the sheet having transverse seals 3 is cut along the axes 4 of the said seals 3 to form a series of individual bags. In Figure 4, the bag receives a line of seal 5 to divide the bag into two spaces, i.e. a space 6 which is to contain the material to be packed and a space 7 which is to constitute the handle of the bag. Figure 5 shows the bag which contains a liquid or flowable solid which is to be stored, this liquid or solid being filled to a level 8 in the space 6, and also contains compressed air in the space 7, the top edge 9 of the bag being closed by a heat-sealed joint. In Figure 5, the dotted line 10 shows the position at which the top corner of the bag is to be cut off in order to empty its contents. Figure 6 shows the bag of Figure 5 in a section along the line VI-VI in Figure 5. Figures 7 to 9 show diagrammatically how compressed air is introduced into the space 7 constituting the handle of the bag. In Figures 7 to 9, a device is shown comprising a compressed air injection probe 11, sealing bars 12 and rubber pads 13. Figure 7 shows the probe 11 introduced into the space 7 which is to form the handle of the bag. In Figure 8, compressed air is being introduced through the probe 11 while hermetically closing the space 7 with the aid of the rubber pads 13. After this, the probe 11 is withdrawn from the space 7, while the rubber pads 13 still compress the walls of the space 7 and thereupon the sealing bars 12 seal the top side of the space 7, as shown in Figure 9. The space 7 may be sealed before, during or after the sealing of the space 6 containing the liquid or flowable solid which is to be stored in the bag. Figure 10 shows that the line of seal 5 may be curved, whereas this line of seal 5 is rectilinear in Figure 4. Figure 11 shows, in addition, that the line of seal 5 may be sinusoidal, each undulation having approximately the width of a finger.

Two following Examples are given for the purpose of illustrating the present invention:-

Example 1

In a JENCO packing machine, a bag according to the present invention is produced from a laminate composed of a film of poly (ethylene terephthalate) with a thickness of 12 microns, a film of polyacrylonitrile with a thickness of 20 microns and a film of medium density polyethylene (d = 0.932) with a thickness of 100 microns.

As shown in Figure 1, the laminate sheet 1 is given a W-shaped fold 2 so that the heat-sealable layer of polyethylene is situated inside the blank. As shown in Figure 2, transverse seals 3 are made, which are to constitute the vertical edges of the bags after actually cutting out along the axes of these seals, as shown in Figure 3. The bags thus cut out are once again subjected to heat sealing along the aforesaid transverse seals 3, in order to seal the bottom ends of the vertical edges of the bags below the point where these two edges meet the apex of the W-fold 2. During the heat sealing, a part of the melted polyethylene constituting the inner layer of the laminate is expelled so that, on cooling, these bottom ends of the bags are sealed. A line of seal 5 of rectilinear shape is then produced, as shown in Figure 4, in order to create the spaces 6 and 7, this line of seal 5 starting from a point situated approximately in the middle of the top edge 9 of the bag and ending at a point which is immediately adjacent to the point of encounter between one of the vertical edges 3 of the bag and the bellows 2. The liquid to be stored is then introduced into the space 6 in the bag at the same time as compressed air is introduced into the space 7, as shown in Figures 7 to 9, the sealing of the entire upper edge 9 of the bag, i.e. the sealing of the spaces 6 and 7 at that point, being effected simultaneously.

Example 2

In a "HAMAC"-HÖLLER packing machine ("HAMAC" is a Registered Trade Mark), a bag according to the present invention is produced with the aid of a laminate which is heat-sealable on both faces and which is composed of a foil of aluminium with a thickness of 12 microns laminated between two films of low density polyethylene (d = 0.912) with a thickness of 80 microns.

For the production of the bag and the packing of a liquid in the latter, the procedure is exactly the same as in Example 1, except that here a curvilinear line of seal 5 is made as shown in Figure 10 and that the sealing of the bottom ends of the vertical edges of the bag, below the point where these two edges meet the apex of the W-fold or bellows 2, is effected over the entire width of the joint in view of the fact that the two faces of the laminate used for producing the bag are in this case heat-sealable.

WHAT WE CLAIM IS:-

1. A flexible bag, provided with a handle, which comprises two superimposed

square- or rectangular-shaped walls of heat-sealable, flexible sheet material having the two vertical edges sealed together to form the two vertical eedges of the bag and having the horizontal bottom edges connected together by a base bellows, which enables the bag to stand upright when partly or completely filled with a liquid or a flowable solid, and wherein the said two walls are further sealed together along an obliquely directed line of seal which starts from the horizontal top edges of these walls at a point situated in the portion lying between the first quarter and the fourth quarter of the length of the said top edges and joints one of the said two vertical edges of the bag at the point at which this vertical edge meets the apex of the base bellows or at a point on this vertical edge immediately adjacent thereto, thus defining in the bag two spaces, the first of which, which is partly defined by the base bellows and is intended to enclose the contents to be packed, is sealed by sealing together the horizontal top edges of the two walls thereof, when it has been filled with the said contents, and the second of which, which is intended to serve as a handle, is inflated with a gas under pressure and sealed by sealing together the horizontal top edges of the two walls thereof, said second space being sealed before, during or after sealing of said first space.

2. A bag according to claim 1, wherein the the heat-sealable, flexible sheet material is made of a single heat-sealable plastics material.

3. A bag according to claim 1, wherein the heat-sealable, flexible sheet material is a laminate formed by the lamination of a plurality of sheets of plastics material, at least one of which is of a heat-sealable plastics material.

4. A bag according to claim 3, wherein the laminate also comprises a sheet of a material other than plastics material.

5. A bag according to any of the preceding claims, wherein the second space, which is intended to serve as a handle, is inflated to a degree such that the thickness of the handle, at the point of its maximum thickness, amounts to several tens of times the thickness of the walls of the bag.

6. A bag according to any of the preceding claims, wherein the obliquely directed line of seal is rectilinear.

7. A bag according to any of claims 1 to 5, wherein the obliquely directed line of seal is curved.

8. A bag according to any of claims 1 to 5, wherein the obliquely directed line of seal is a sinusoid in which each undulation has approximately the width of a finger.

9. A bag according to claim 1, substantially as hereinbefore described and exemplified, with reference to Figures 1 to 11 of the accompanying drawings.

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1598843 COMPLETE SPECIFICATION

3 SHEETS *This drawing is a reproduction of the Original on a reduced scale*

Sheet 1

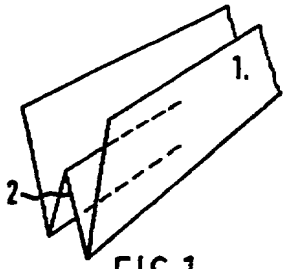


FIG.1

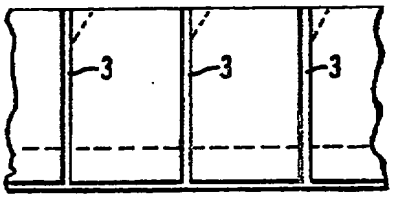


FIG.2

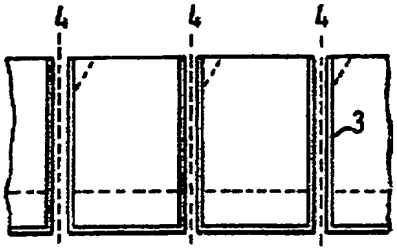


FIG.3

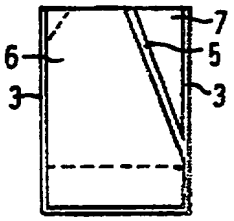


FIG.4

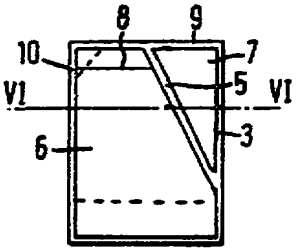
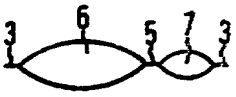


FIG.5



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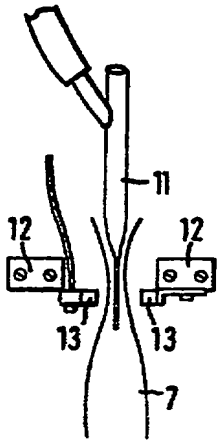

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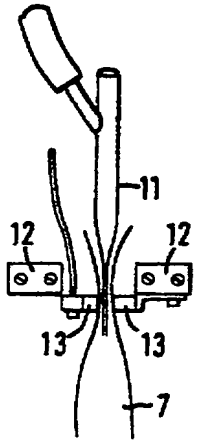

FIG.8

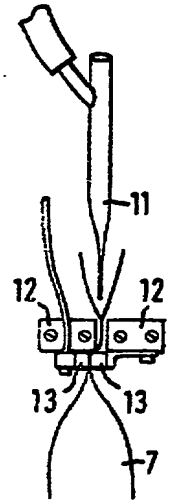

FIG.9

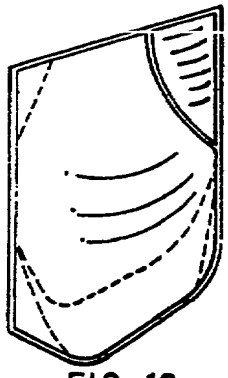

FIG.10

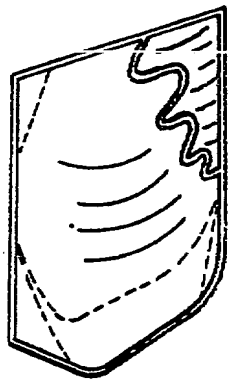

FIG.11

1598843 COMPLETE SPECIFICATION
3 SHEETS *This drawing is a reproduction of the Original on a reduced scale*
Sheet 3

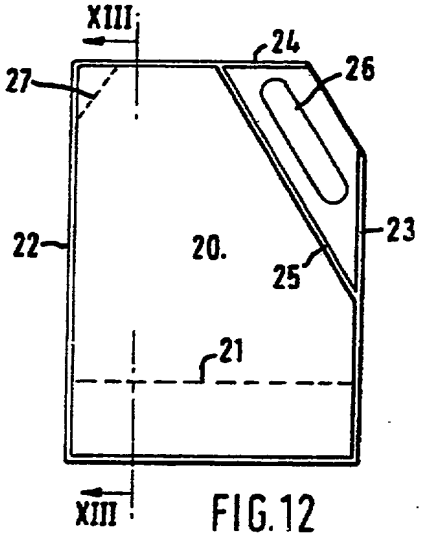

FIG.12

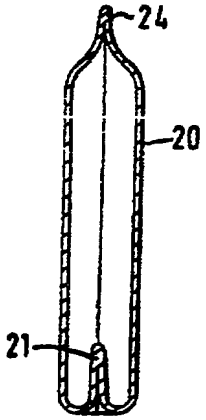

FIG.13